



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5 CHICAGO REGIONAL LABORATORY
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605



Date: 1/13/2015
Subject: Review of Region 5 Data for BP Whiting Refinery
To: Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60605
From: Wayne Whipple, Analyst
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X 

Jan 13 2015

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: BP Whiting Refinery

Data Management Coordinator and Date Transmitted

Analyses included in this report:

Air Toxics Reimer 5



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Air Division, US EPA Region 5
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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Analysis Case Narrative for Volatile Organic Compounds (VOC) Air Toxics

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General Information

Three 15 L canisters and two six liter canisters were received in good condition from the Air and Radiation Division monitoring group on September 18, 2014. The samples met hold time.

The samples were analyzed for VOC Air Toxics using SOP MS-005 Revision 6 with cold trap dehydration preconcentrator on Amelia. (Reference Method US EPA TO-15). Three Pen and Ink Changes are also included, MS005 r5.0-P01 and P03. The pen and ink changes use the manufacturers recommended mass spectrometer tune check requirements instead of BFB. The halocarbon sample monitoring compound concentrations and acceptance criteria is updated in -03.

Data are reported to a reporting limit of 25 pptv and at least 35 pptv was requested in the Quality Assurance Project Plan, QAPP and meets the QAPP requirements. (EPA Region 5 VOC Sampling Comparison QAPP v1 1)

Sample Analysis and Results

The criteria used for determining if system contamination influences the sample results is for a sample result to be over three to five times the contamination in the blank checks.

Compounds reported have been updated since MS 005 revision 6. The standards that are available do not contain many analytes that are listed in the SOP. There are a few compounds in the standard that have not been fully documented for CRL quality assurance. Since they have not undergone full quality assurance acceptance these compounds, n-heptane and naphthalene, 4-ethyl toluene, *trans* 1,2-dichloroethene, and dibromochloromethane will be flagged as estimated.

Quality Control

Calibration modifications:

The sample results for acetone in all the samples were higher than the highest calibration curve for sample 1409007-02 which was not run for dilution so the data was flagged estimated in that sample. Other sample results



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for acetone and ethanol were reported from diluted analysis. The QC results for those samples are only presented for the reported analytes and selected sample monitoring compounds.

Data from 1409007-04 and -05 have been reanalyzed multiple times at various dilutions. Acetone, Methylene Chloride and isopropyl alcohol are rejected from sample 1409007-04 and is reported from the reanalysis 1409007-04RE2. The QC from that batch is only reported for those two compounds.

Acrolein and 1,3-butadiene and propene are biased high because of coeluting hydrocarbons that cannot be resolved or deconvoluted and therefore the data is flagged biased high, K..

A number of compounds had their reporting limits raised to an acceptable region of the calibration curve that passes the SOP criteria. Ethanol, 1,2-dichlorobenzene, o-xylene, and isopropyl alcohol are raised to 50 pptv. Methylene chloride, styrene and bromoform, m+p-xylene, 1,3- and 1,4-dichlorobenzene and hexachlorobutadiene are raised to 100 pptv and 4-methyl-2-pentanone rejected because of vary poor calibration performance.

There are two calibration file date and time stamps because of the software updates the date and time stamp for an unknown reason but the equations have not changed. The two reports are provided to show identical equations and calculations.

F-113 and 1,1-dichloroethene had low recoveries in the Initial Calibration Verification (ICV) standard and are therefore flagged as estimated.

1,4-dioxane's and 2-hexanone's calibration had an excessive percent error that does not meet the SOP criteria throughout most of the calibration curve and therefore the results are rejected.

Relative percent difference, RPD results are followed from the SOP and not the final report.

Ethanol is qualified as estimated "J" flag because of poor calibration performance. The calibration is not ideal and reduces the confidence in the results for this compound.

Naphthalene is flagged as estimated because the performance of the analytical system is not as reliable having an acceptable calibration response above 250 pptv for that late eluting compound and it fails the second source ICV standard.

1,1,1-Trichloroethane is reported below the detection limit for tracking of the sample monitoring compound. The result is within the expected global results, although is still flagged as estimated because it is below the detection limit. The result is also within 5 times the blank result but it is already flagged as estimated so no further action is required.

Carbon disulfide's analytical performance is extremely poor so the compound is rejected from this report.

Method Blank and Canister Blanks are qualified as high bias or have their reporting limits raised if the results



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from the sample are within 5x the results from the blank. Acetone has been flagged K as high bias for the diluted samples although the result is very close to the undiluted sample suggesting the bias may be negligible. Methylene chloride is qualified high bias in samples -04 and -05.

System monitoring compounds are guidelines to monitor the success and quality of analytical integrity. They are guidelines with limits set around very consistent global background concentrations. The limits are suggested and open to interpretation of the analyst. Many of the compounds are extremely close to or below the detection limit of the instrumentation. There is no reason to flag any of the samples in this data set for exceedences of the limits applied to these compounds.



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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4	1409007-01	Air	Sep-18-14 09:39	Sep-18-14 14:00
1	1409007-02	Air	Sep-18-14 10:25	Sep-18-14 14:00
3	1409007-03	Air	Sep-18-14 11:20	Sep-18-14 14:00
2	1409007-04	Air	Sep-18-14 12:10	Sep-18-14 14:00
4B	1409007-05	Air	Sep-18-14 00:00	Sep-18-14 14:00



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

4 (1409007-01) Air Sampled: Sep-18-14 09:39 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.77	K		0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Chloromethane	0.496			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0440	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Acrolein	0.891	K		0.0250	"	"	"	"	"
Isopropyl alcohol	1.52	J		0.0500	"	"	"	"	"
1,1-Dichloroethene	U	J		0.0250	"	"	"	"	"
Methylene chloride	0.259			0.100	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.613			0.0250	"	"	"	"	"
2-Butanone	0.593			0.0250	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U	J		0.0250	"	"	"	"	"
Chloroform	0.0311			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.184			0.0250	"	"	"	"	"
Benzene	0.318			0.0250	"	"	"	"	"
n-Heptane	0.177	J		0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
1,4-Dioxane	Rejected			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	Rejected			0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U	J		0.0250	"	"	"	"	"
Toluene	0.639			0.0250	"	"	"	"	"
2-Hexanone	Rejected			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"



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4 (1409007-01) Air Sampled: Sep-18-14 09:39 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Chlorobenzene	U			0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Ethylbenzene	0.0810			0.0250	"	"	"	"	"
m+p-Xylene	0.245			0.100	"	"	"	"	"
Bromoform	U			0.100	"	"	"	"	"
Styrene	U			0.100	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0822			0.0500	"	"	"	"	"
4-ethyltoluene	0.108	J		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0500	"	"	"	"	"
1,2,4-Trimethylbenzene	0.137			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.100	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.100	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0500	"	"	"	"	"
1,2,4-Trichlorobenzene	0.200			0.100	"	"	"	"	"
Naphthalene	1.22	J, K		0.100	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.353		67%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0189		95%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.200		84%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0357	J	49%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	4.36E-3	J	87%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0663		77%	80-120	"	"	"

4 (1409007-01RE1) Air Sampled: Sep-18-14 09:39 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Ethanol	2.40	J		0.500	ppbv	10	B411044	Sep-22-14	Sep-22-14
Acetone	3.55	J, K		0.250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.490		93%	90-120	"	"	"
Surrogate: Trichlorofluoromethane	U		83%	90-120	"	"	"
Surrogate: Carbon tetrachloride	U		67%	80-120	"	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

1 (1409007-02) Air Sampled: Sep-18-14 10:25 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.40	K		0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Chloromethane	0.495			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0356	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Ethanol	1.94	J		0.0500	"	"	"	"	"
Acrolein	0.760	K		0.0250	"	"	"	"	"
Isopropyl alcohol	1.11	J		0.0500	"	"	"	"	"
Acetone	2.78	J		0.0250	"	"	"	"	"
1,1-Dichloroethene	U	J		0.0250	"	"	"	"	"
Methylene chloride	0.182			0.100	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.543			0.0250	"	"	"	"	"
2-Butanone	0.353			0.0250	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U	J		0.0250	"	"	"	"	"
Chloroform	0.0316			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.237			0.0250	"	"	"	"	"
Benzene	0.283			0.0250	"	"	"	"	"
n-Heptane	0.227	J		0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
1,4-Dioxane	Rejected			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	Rejected			0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U	J		0.0250	"	"	"	"	"
Toluene	0.618			0.0250	"	"	"	"	"
2-Hexanone	Rejected			0.0250	"	"	"	"	"



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1 (1409007-02) Air Sampled: Sep-18-14 10:25 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
1,2-Dibromoethane (EDB)	U			0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0876			0.0250	"	"	"	"	"
m+p-Xylene	0.249			0.100	"	"	"	"	"
Bromoform	U			0.100	"	"	"	"	"
Styrene	U			0.100	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0911			0.0500	"	"	"	"	"
4-ethyltoluene	0.117	J		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0500	"	"	"	"	"
1,2,4-Trimethylbenzene	0.160			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.100	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.100	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0500	"	"	"	"	"
1,2,4-Trichlorobenzene	0.186			0.100	"	"	"	"	"
Naphthalene	1.15	J, K		0.100	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.408		78%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0184		92%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.200		84%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0346	J	47%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	5.80E-3	J	116%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0658		77%	80-120	"	"	"



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3 (1409007-03) Air Sampled: Sep-18-14 11:20 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	0.903	K		0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Chloromethane	0.461			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0260	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Acrolein	0.437	K		0.0250	"	"	"	"	"
Isopropyl alcohol	1.09	J		0.0500	"	"	"	"	"
1,1-Dichloroethene	U	J		0.0250	"	"	"	"	"
Methylene chloride	0.159			0.100	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.366			0.0250	"	"	"	"	"
2-Butanone	0.462			0.0250	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U	J		0.0250	"	"	"	"	"
Chloroform	0.0266			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.109			0.0250	"	"	"	"	"
Benzene	0.200			0.0250	"	"	"	"	"
n-Heptane	0.131	J		0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
1,4-Dioxane	Rejected			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	Rejected			0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U	J		0.0250	"	"	"	"	"
Toluene	0.433			0.0250	"	"	"	"	"
2-Hexanone	Rejected			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"



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Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Chlorobenzene	U			0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Ethylbenzene	0.0620			0.0250	"	"	"	"	"
m+p-Xylene	0.177			0.100	"	"	"	"	"
Bromoform	U			0.100	"	"	"	"	"
Styrene	U			0.100	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0646			0.0500	"	"	"	"	"
4-ethyltoluene	0.0804	J		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0500	"	"	"	"	"
1,2,4-Trimethylbenzene	0.109			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.100	"	"	"	"	"
Benzyl chloride	0.0252			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.100	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0500	"	"	"	"	"
1,2,4-Trichlorobenzene	0.209			0.100	"	"	"	"	"
Naphthalene	1.27	J, K		0.100	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.400		76%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0190		95%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.195		82%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0371	J	51%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	5.33E-3	J	107%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0674		78%	80-120	"	"	"

3 (1409007-03RE1) Air Sampled: Sep-18-14 11:20 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Ethanol	2.26	J		0.500	ppbv	10	B411044	Sep-22-14	Sep-22-14
Acetone	2.80	J		0.250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.442		84%	90-120	"	"	"
Surrogate: Trichlorofluoromethane	U		76%	90-120	"	"	"
Surrogate: Carbon tetrachloride	U		77%	80-120	"	"	"



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1409007-04) Air Sampled: Sep-18-14 12:10 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.03	K		0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Chloromethane	0.567			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0392	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Acrolein	0.722	K		0.0250	"	"	"	"	"
1,1-Dichloroethene	U	J		0.0250	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.512			0.0250	"	"	"	"	"
2-Butanone	0.588			0.0250	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U	J		0.0250	"	"	"	"	"
Chloroform	0.0703			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.156			0.0250	"	"	"	"	"
Benzene	0.300			0.0250	"	"	"	"	"
n-Heptane	0.186	J		0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
1,4-Dioxane	Rejected			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	Rejected			0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U	J		0.0250	"	"	"	"	"
Toluene	0.679			0.0250	"	"	"	"	"
2-Hexanone	Rejected			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.149			0.0250	"	"	"	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1409007-04) Air Sampled: Sep-18-14 12:10 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
m+p-Xylene	0.473			0.100	ppbv	1	B409106	Sep-19-14	Sep-19-14
Bromoform	U			0.100	"	"	"	"	"
Styrene	U			0.100	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.162			0.0500	"	"	"	"	"
4-ethyltoluene	0.145	J		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0500	"	"	"	"	"
1,2,4-Trimethylbenzene	0.190			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.100	"	"	"	"	"
Benzyl chloride	0.0704			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.100	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0500	"	"	"	"	"
1,2,4-Trichlorobenzene	0.190			0.100	"	"	"	"	"
Naphthalene	0.973	J, K		0.100	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
<i>Surrogate: Dichlorodifluoromethane</i>	0.425		81%	90-120	"	"	"
<i>Surrogate: Dichlorotetrafluoroethane</i>	0.0209		104%	80-120	"	"	"
<i>Surrogate: Trichlorofluoromethane</i>	0.295		123%	90-120	"	"	"
<i>Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)</i>	0.0471	J	65%	90-120	"	"	"
<i>Surrogate: 1,1,1-Trichloroethane</i>	6.28E-3	J	126%	80-120	"	"	"
<i>Surrogate: Carbon tetrachloride</i>	0.123		143%	80-120	"	"	"

2 (1409007-04RE1) Air Sampled: Sep-18-14 12:10 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Isopropyl alcohol	1.02	J		0.0500	ppbv	1	B411044	Sep-23-14	Sep-23-14
Methylene chloride	0.164	K		0.100	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
<i>Surrogate: Dichlorodifluoromethane</i>	0.397		76%	90-120	"	"	"
<i>Surrogate: Trichlorofluoromethane</i>	0.200		84%	90-120	"	"	"
<i>Surrogate: Carbon tetrachloride</i>	0.0694		81%	80-120	"	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1409007-04RE2) Air Sampled: Sep-18-14 12:10 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Ethanol	2.34	J		0.333	ppbv	6.667	B411044	Sep-22-14	Sep-22-14
Acetone	2.42	J, K		0.167	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
<i>Surrogate: Dichlorodifluoromethane</i>	0.483		92%	90-120	"	"	"
<i>Surrogate: Trichlorofluoromethane</i>	U		81%	90-120	"	"	"
<i>Surrogate: Carbon tetrachloride</i>	U		67%	80-120	"	"	"

4B (1409007-05) Air Sampled: Sep-18-14 00:00 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	0.927	K		0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Chloromethane	0.506			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	U	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Acrolein	0.531	K		0.0250	"	"	"	"	"
Isopropyl alcohol	1.14	J		0.0500	"	"	"	"	"
1,1-Dichloroethene	U	J		0.0250	"	"	"	"	"
Methylene chloride	0.163	K		0.100	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.391			0.0250	"	"	"	"	"
2-Butanone	0.410			0.0250	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U	J		0.0250	"	"	"	"	"
Chloroform	0.0255			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.126			0.0250	"	"	"	"	"
Benzene	0.230			0.0250	"	"	"	"	"
n-Heptane	0.148	J		0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

4B (1409007-05) Air Sampled: Sep-18-14 00:00 Received: Sep-18-14 14:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Trichloroethene	U			0.0250	ppbv	1	B409106	Sep-19-14	Sep-19-14
Bromodichloromethane	U			0.0250	"	"	"	"	"
1,4-Dioxane	Rejected			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	Rejected			0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U	J		0.0250	"	"	"	"	"
Toluene	0.462			0.0250	"	"	"	"	"
2-Hexanone	Rejected			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0689			0.0250	"	"	"	"	"
m+p-Xylene	0.185			0.100	"	"	"	"	"
Bromoform	U			0.100	"	"	"	"	"
Styrene	U			0.100	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0702			0.0500	"	"	"	"	"
4-ethyltoluene	0.0755	J		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0500	"	"	"	"	"
1,2,4-Trimethylbenzene	0.0898			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.100	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.100	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0500	"	"	"	"	"
1,2,4-Trichlorobenzene	0.177			0.100	"	"	"	"	"
Naphthalene	1.00	J, K		0.100	"	"	"	"	"

Surrogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.426	81%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0203	102%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.202	85%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0367	J	50%	90-120	"	"
Surrogate: 1,1,1-Trichloroethane	3.45E-3	J	69%	80-120	"	"
Surrogate: Carbon tetrachloride	0.0624		73%	80-120	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

4B (1409007-05RE2) Air **Sampled: Sep-18-14 00:00** **Received: Sep-18-14 14:00**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Ethanol	3.34	J		0.333	ppbv	6.667	B411044	Sep-22-14	Sep-22-14
Acetone	2.39	K, J		0.167	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
<i>Surrogate: Dichlorodifluoromethane</i>	0.448	85%	90-120	"	"	"
<i>Surrogate: Trichlorofluoromethane</i>	U	79%	90-120	"	"	"
<i>Surrogate: Carbon tetrachloride</i>	U	65%	80-120	"	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

Blank (B409106-BLK1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Propene	U			0.0250	ppbv						
Chloromethane	U			0.0250	"						
Vinyl chloride	U			0.0250	"						
1,3-butadiene	U			0.0250	"						
Bromomethane	U			0.0250	"						
Chloroethane	U			0.0250	"						
Ethanol	U	J		0.0500	"						
Acrolein	0.0258			0.0250	"						
Isopropyl alcohol	0.105	J		0.0500	"						
Acetone	0.106	J		0.0250	"						
1,1-Dichloroethene	U	J		0.0250	"						
Methylene chloride	U			0.100	"						
Carbon disulfide	Rejected			0.0250	"						
Methyl tert-butyl ether	U			0.0250	"						
1,1-Dichloroethane	U			0.0250	"						
Vinyl acetate	U			0.0250	"						
Hexane	U			0.0250	"						
2-Butanone	U			0.0250	"						
cis-1,2-Dichloroethene	U			0.0250	"						
trans-1,2-Dichloroethene	U	J		0.0250	"						
Chloroform	U			0.0250	"						
1,2-Dichloroethane	U			0.0250	"						
Cyclohexane	U			0.0250	"						
Benzene	U			0.0250	"						
n-Heptane	U	J		0.0250	"						
1,2-Dichloropropane	U			0.0250	"						
Trichloroethene	U			0.0250	"						
Bromodichloromethane	U			0.0250	"						
1,4-Dioxane	Rejected			0.0250	"						
cis-1,3-Dichloropropene	U			0.0250	"						
4-Methyl-2-pentanone	Rejected			0.0250	"						
trans-1,3-Dichloropropene	U			0.0250	"						
1,1,2-Trichloroethane	U			0.0250	"						



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Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

Blank (B409106-BLK1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Dibromochloromethane	U	J		0.0250	ppbv						
Toluene	U			0.0250	"						
2-Hexanone	Rejected			0.0250	"						
1,2-Dibromoethane (EDB)	U			0.0250	"						
Tetrachloroethene	U			0.0250	"						
Chlorobenzene	U			0.0250	"						
Ethylbenzene	U			0.0250	"						
m+p-Xylene	U			0.100	"						
Bromoform	U			0.100	"						
Styrene	U			0.100	"						
1,1,2,2-Tetrachloroethane	U			0.0250	"						
o-Xylene	U			0.0500	"						
4-ethyltoluene	U	J		0.0250	"						
1,3,5-Trimethylbenzene	U			0.0500	"						
1,2,4-Trimethylbenzene	U			0.0250	"						
1,3-Dichlorobenzene	U			0.100	"						
Benzyl chloride	U			0.0250	"						
1,4-Dichlorobenzene	U			0.100	"						
1,2-Dichlorobenzene	U			0.0500	"						
1,2,4-Trichlorobenzene	U			0.100	"						
Naphthalene	U	J		0.100	"						
Surrogate: Dichlorodifluoromethane	U				"	0.5250		%	90-120		
Surrogate: Dichlorotetrafluoroethane	3.85E-3				"	2.000E-2		19%	80-120		
Surrogate: Trichlorofluoromethane	U				"	0.2390		%	90-120		
Surrogate:	U	J			"	7.300E-2		%	90-120		
1,1,2-trichloro-1,2,2-trifluoroethane (Freon)											
Surrogate: 1,1,1-Trichloroethane	3.05E-3	J			"	5.000E-3		61%	80-120		
Surrogate: Carbon tetrachloride	U				"	8.600E-2		%	80-120		



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Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

LCS (B409106-BS1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Propene	0.511			0.0250	ppbv	0.5000		102% 76-112		
Chloromethane	0.507			0.0250	"	0.5000		101% 77.6-116		
Vinyl chloride	0.504			0.0250	"	0.5000		101% 77.4-117		
1,3-butadiene	0.463			0.0250	"	0.5000		93% 77.7-115		
Bromomethane	0.504			0.0250	"	0.5000		101% 75.2-117		
Chloroethane	0.465			0.0250	"	0.5000		93% 79.8-114		
Ethanol	0.672	J		0.0500	"	0.5000		134% 50-124		
Acrolein	0.490			0.0250	"	0.5000		98% 67.9-130		
Isopropyl alcohol	0.329	J		0.0500	"	0.5000		66% 81-106		
Acetone	0.442	J		0.0250	"	0.5000		88% 60-137		
1,1-Dichloroethene	0.445	J		0.0250	"	0.5000		89% 77.3-118		
Methylene chloride	0.521			0.100	"	0.5000		104% 78.7-117		
Carbon disulfide	Rejected			0.0250	"	0.5000		90% 53-140		
Methyl tert-butyl ether	0.409			0.0250	"	0.5000		82% 79.1-118		
1,1-Dichloroethane	0.431			0.0250	"	0.5000		86% 79.8-117		
Vinyl acetate	0.373			0.0250	"	0.5000		75% 85-106		
Hexane	0.437			0.0250	"	0.5000		87% 70.1-121		
2-Butanone	0.363			0.0250	"	0.5000		73% 82-108		
cis-1,2-Dichloroethene	0.460			0.0250	"	0.5000		92% 78.1-115		
trans-1,2-Dichloroethene	0.501	J		0.0250	"	0.5000		100% 0-200		
Chloroform	0.491			0.0250	"	0.5000		98% 79.6-115		
1,2-Dichloroethane	0.531			0.0250	"	0.5000		106% 79.8-115		
Cyclohexane	0.441			0.0250	"	0.5000		88% 72.5-119		
Benzene	0.494			0.0250	"	0.5000		99% 75.7-118		
n-Heptane	0.447	J		0.0250	"	0.5000		89% 66.9-152		
1,2-Dichloropropane	0.532			0.0250	"	0.5000		106% 76.8-118		
Trichloroethene	0.445			0.0250	"	0.5000		89% 70.1-119		
Bromodichloromethane	0.473			0.0250	"	0.5000		95% 75.8-117		
1,4-Dioxane	Rejected			0.0250	"	0.5000		81% 54.7-150		
cis-1,3-Dichloropropene	0.436			0.0250	"	0.5000		87% 75.5-115		
4-Methyl-2-pentanone	Rejected			0.0250	"	0.5000		72% 62.9-133		
trans-1,3-Dichloropropene	0.479			0.0250	"	0.5000		96% 75.8-117		
1,1,2-Trichloroethane	0.463			0.0250	"	0.5000		93% 92.3-106		
Dibromochloromethane	0.450	J		0.0250	"	0.5000		90% 69-132		



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

LCS (B409106-BS1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Toluene	0.448			0.0250	ppbv	0.5000		90%	73.2-120		
2-Hexanone	Rejected			0.0250	"	0.5000		39%	76-110		
1,2-Dibromoethane (EDB)	0.480			0.0250	"	0.5000		96%	75.5-118		
Tetrachloroethene	0.466			0.0250	"	0.5000		93%	67.1-125		
Chlorobenzene	0.510			0.0250	"	0.5000		102%	68.5-121		
Ethylbenzene	0.468			0.0250	"	0.5000		94%	74.9-118		
m+p-Xylene	0.916			0.100	"	1.000		92%	79.8-121		
Bromoform	0.435			0.100	"	0.5000		87%	72.4-119		
Styrene	0.428			0.100	"	0.5000		86%	71.5-122		
1,1,2,2-Tetrachloroethane	0.490			0.0250	"	0.5000		98%	92-106		
o-Xylene	0.444			0.0500	"	0.5000		89%	77.6-124		
4-ethyltoluene	0.511	J		0.0250	"	0.5000		102%	96.7-122		
1,3,5-Trimethylbenzene	0.513			0.0500	"	0.5000		103%	74.4-121		
1,2,4-Trimethylbenzene	0.492			0.0250	"	0.5000		98%	71.9-126		
1,3-Dichlorobenzene	0.525			0.100	"	0.5000		105%	67.9-132		
Benzyl chloride	0.503			0.0250	"	0.5000		101%	60.7-134		
1,4-Dichlorobenzene	0.521			0.100	"	0.5000		104%	65.4-136		
1,2-Dichlorobenzene	0.517			0.0500	"	0.5000		103%	69.3-129		
1,2,4-Trichlorobenzene	0.506			0.100	"	0.5000		101%	39.7-186		
Naphthalene	0.573	J		0.100	"				40-200		
<i>Surrogate: Dichlorodifluoromethane</i>	<i>0.505</i>				"	<i>0.5000</i>		<i>101%</i>	<i>77.8-116</i>		
<i>Surrogate: Dichlorotetrafluoroethane</i>	<i>0.518</i>				"	<i>0.5000</i>		<i>104%</i>	<i>89-108</i>		
<i>Surrogate: Trichlorofluoromethane</i>	<i>0.486</i>				"	<i>0.5000</i>		<i>97%</i>	<i>78.6-114</i>		
<i>Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (Freon)</i>	<i>0.686</i>	J			"	<i>0.5000</i>		<i>137%</i>	<i>75.3-119</i>		
<i>Surrogate: 1,1,1-Trichloroethane</i>	<i>0.496</i>				"	<i>0.5000</i>		<i>99%</i>	<i>92.5-105</i>		
<i>Surrogate: Carbon tetrachloride</i>	<i>0.527</i>				"	<i>0.5000</i>		<i>105%</i>	<i>76.3-118</i>		

LCS Dup (B409106-BSD1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Propene	0.512			0.0250	ppbv	0.5000		102%	76-112	0.2	19.6
Chloromethane	0.490			0.0250	"	0.5000		98%	77.6-116	3	26.9
Vinyl chloride	0.498			0.0250	"	0.5000		100%	77.4-117	1	25.1



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

LCS Dup (B409106-BSD1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
1,3-butadiene	0.412			0.0250	ppbv	0.5000		82% 77.7-115	12	33.2
Bromomethane	0.536			0.0250	"	0.5000		107% 75.2-117	6	26.6
Chloroethane	0.584			0.0250	"	0.5000		117% 79.8-114	23	29.5
Ethanol	0.696	J		0.0500	"	0.5000		139% 50-124	3	200
Acrolein	0.457			0.0250	"	0.5000		91% 67.9-130	7	29.8
Isopropyl alcohol	0.334	J		0.0500	"	0.5000		67% 81-106	1	25
Acetone	0.419	J		0.0250	"	0.5000		84% 60-137	5	28.7
1,1-Dichloroethene	0.488	J		0.0250	"	0.5000		98% 77.3-118	9	15.9
Methylene chloride	0.543			0.100	"	0.5000		109% 78.7-117	4	20.7
Carbon disulfide	Rejected			0.0250	"	0.5000		101% 53-140	11	200
Methyl tert-butyl ether	0.357			0.0250	"	0.5000		71% 79.1-118	14	31.9
1,1-Dichloroethane	0.404			0.0250	"	0.5000		81% 79.8-117	7	13.1
Vinyl acetate	0.349			0.0250	"	0.5000		70% 85-106	7	200
Hexane	0.400			0.0250	"	0.5000		80% 70.1-121	9	43.5
2-Butanone	0.347			0.0250	"	0.5000		69% 82-108	5	25
cis-1,2-Dichloroethene	0.418			0.0250	"	0.5000		84% 78.1-115	10	29.6
trans-1,2-Dichloroethene	0.478	J		0.0250	"	0.5000		96% 0-200	5	25
Chloroform	0.467			0.0250	"	0.5000		93% 79.6-115	5	25.2
1,2-Dichloroethane	0.504			0.0250	"	0.5000		101% 79.8-115	5	24.6
Cyclohexane	0.425			0.0250	"	0.5000		85% 72.5-119	4	34.5
Benzene	0.451			0.0250	"	0.5000		90% 75.7-118	9	27.4
n-Heptane	0.417	J		0.0250	"	0.5000		83% 66.9-152	7	25
1,2-Dichloropropane	0.501			0.0250	"	0.5000		100% 76.8-118	6	25.3
Trichloroethene	0.427			0.0250	"	0.5000		85% 70.1-119	4	34.1
Bromodichloromethane	0.443			0.0250	"	0.5000		89% 75.8-117	7	26.5
1,4-Dioxane	Rejected			0.0250	"	0.5000		75% 54.7-150	8	58.6
cis-1,3-Dichloropropene	0.389			0.0250	"	0.5000		78% 75.5-115	11	31.1
4-Methyl-2-pentanone	Rejected			0.0250	"	0.5000		73% 62.9-133	0.4	42
trans-1,3-Dichloropropene	0.427			0.0250	"	0.5000		85% 75.8-117	11	31.7
1,1,2-Trichloroethane	0.446			0.0250	"	0.5000		89% 92.3-106	4	11.5
Dibromochloromethane	0.432	J		0.0250	"	0.5000		86% 69-132	4	25
Toluene	0.424			0.0250	"	0.5000		85% 73.2-120	5	30.6
2-Hexanone	Rejected			0.0250	"	0.5000		36% 76-110	7	46.8
1,2-Dibromoethane (EDB)	0.440			0.0250	"	0.5000		88% 75.5-118	9	31.5



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

LCS Dup (B409106-BSD1)

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Tetrachloroethene	0.445			0.0250	ppbv	0.5000		89%	67.1-125	5	13.8
Chlorobenzene	0.503			0.0250	"	0.5000		101%	68.5-121	1	31.9
Ethylbenzene	0.464			0.0250	"	0.5000		93%	74.9-118	0.7	31.6
m+p-Xylene	0.915			0.100	"	1.000		91%	79.8-121	0.1	28.9
Bromoform	0.426			0.100	"	0.5000		85%	72.4-119	2	34.6
Styrene	0.429			0.100	"	0.5000		86%	71.5-122	0.2	19.7
1,1,2,2-Tetrachloroethane	0.476			0.0250	"	0.5000		95%	92-106	3	11.5
o-Xylene	0.416			0.0500	"	0.5000		83%	77.6-124	7	28.7
4-ethyltoluene	0.534	J		0.0250	"	0.5000		107%	96.7-122	4	25
1,3,5-Trimethylbenzene	0.544			0.0500	"	0.5000		109%	74.4-121	6	29.8
1,2,4-Trimethylbenzene	0.534			0.0250	"	0.5000		107%	71.9-126	8	32.1
1,3-Dichlorobenzene	0.525			0.100	"	0.5000		105%	67.9-132	0.07	37.9
Benzyl chloride	0.494			0.0250	"	0.5000		99%	60.7-134	2	48.3
1,4-Dichlorobenzene	0.520			0.100	"	0.5000		104%	65.4-136	0.1	39.6
1,2-Dichlorobenzene	0.538			0.0500	"	0.5000		108%	69.3-129	4	34
1,2,4-Trichlorobenzene	0.529			0.100	"	0.5000		106%	39.7-186	4	77.1
Naphthalene	0.728	J		0.100	"				40-200	24	200
Surrogate: Dichlorodifluoromethane	0.532				"	0.5000		106%	77.8-116		
Surrogate: Dichlorotetrafluoroethane	0.536				"	0.5000		107%	89-108		
Surrogate: Trichlorofluoromethane	0.507				"	0.5000		101%	78.6-114		
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (Freon)	0.609	J			"	0.5000		122%	75.3-119		
Surrogate: 1,1,1-Trichloroethane	0.477				"	0.5000		95%	92.5-105		
Surrogate: Carbon tetrachloride	0.498				"	0.5000		100%	76.3-118		

Duplicate (B409106-DUP1)

Source: 1409007-03

Prepared & Analyzed: Sep-19-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Propene	0.912	K		0.0250	ppbv		0.903			1	30
Chloromethane	0.462			0.0250	"		0.461			0.2	30
Vinyl chloride	U			0.0250	"		U				30
1,3-butadiene	0.0257	K		0.0250	"		0.0260			1	30
Bromomethane	6.65E-3			0.0250	"		5.68E-3			16	30
Chloroethane	U			0.0250	"		7.73E-3				30



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
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Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

Duplicate (B409106-DUP1)		Source: 1409007-03		Prepared & Analyzed: Sep-19-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Ethanol	2.27	J		0.0500	ppbv		2.25			0.9	40
Acrolein	0.464			0.0250	"		0.437			6	40
Isopropyl alcohol	1.06	J		0.0500	"		1.09			2	40
Acetone	2.63	J		0.0250	"		2.61			0.6	40
1,1-Dichloroethene	U	J		0.0250	"		U				30
Methylene chloride	0.114			0.100	"		0.159			33	30
Carbon disulfide	Rejected			0.0250	"		Rejected			3	40
Methyl tert-butyl ether	U			0.0250	"		U				40
1,1-Dichloroethane	U			0.0250	"		U				30
Vinyl acetate	8.62E-3			0.0250	"		U				40
Hexane	U			0.0250	"		0.366				30
2-Butanone	0.458			0.0250	"		0.462			0.9	50
cis-1,2-Dichloroethene	U			0.0250	"		U				30
trans-1,2-Dichloroethene	5.52E-3	J		0.0250	"		5.89E-3			6	30
Chloroform	0.0272			0.0250	"		0.0266			2	30
1,2-Dichloroethane	9.26E-3			0.0250	"		9.58E-3			3	30
Cyclohexane	0.112			0.0250	"		0.109			3	30
Benzene	0.202			0.0250	"		0.200			1	30
n-Heptane	0.134	J		0.0250	"		0.131			2	30
1,2-Dichloropropane	U			0.0250	"		U				30
Trichloroethene	0.0115			0.0250	"		0.0108			6	30
Bromodichloromethane	U			0.0250	"		U				30
1,4-Dioxane	Rejected			0.0250	"		Rejected				40
cis-1,3-Dichloropropene	U			0.0250	"		U				30
4-Methyl-2-pentanone	Rejected			0.0250	"		Rejected			0.5	40
trans-1,3-Dichloropropene	U			0.0250	"		U				30
1,1,2-Trichloroethane	U			0.0250	"		U				30
Dibromochloromethane	U	J		0.0250	"		U				30
Toluene	0.424			0.0250	"		0.433			2	30
2-Hexanone	Rejected			0.0250	"		Rejected			2	40
1,2-Dibromoethane (EDB)	U			0.0250	"		U				30
Tetrachloroethene	0.0160			0.0250	"		0.0165			3	30
Chlorobenzene	0.0118			0.0250	"		0.0120			2	30
Ethylbenzene	0.0609			0.0250	"		0.0620			2	30



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Reported:
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Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B409106 - ColdTrap Dehydration

Duplicate (B409106-DUP1)		Source: 1409007-03		Prepared & Analyzed: Sep-19-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
m+p-Xylene	0.173			0.100	ppbv		0.177			3	30
Bromoform	8.15E-3			0.100	"		8.25E-3			1	30
Styrene	0.0200			0.100	"		0.0207			3	30
1,1,2,2-Tetrachloroethane	8.56E-3			0.0250	"		U				30
o-Xylene	0.0625			0.0500	"		0.0646			3	30
4-ethyltoluene	0.0791	J		0.0250	"		0.0804			2	30
1,3,5-Trimethylbenzene	0.0252			0.0500	"		0.0254			1	30
1,2,4-Trimethylbenzene	0.112			0.0250	"		0.109			3	30
1,3-Dichlorobenzene	U			0.100	"		U				30
Benzyl chloride	7.41E-3			0.0250	"		0.0252			109	30
1,4-Dichlorobenzene	0.0147			0.100	"		0.0144			2	30
1,2-Dichlorobenzene	U			0.0500	"		U				30
1,2,4-Trichlorobenzene	0.217			0.100	"		0.209			4	30
Naphthalene	1.31	J, K		0.100	"		1.27			4	30
Surrogate: Dichlorodifluoromethane	0.418				"	0.5250		80%	90-120		
Surrogate: Dichlorotetrafluoroethane	0.0188				"	2.000E-2		94%	80-120		
Surrogate: Trichlorofluoromethane	0.204				"	0.2390		85%	90-120		
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (Freon)	0.0528	J			"	7.300E-2		72%	90-120		
Surrogate: 1,1,1-Trichloroethane	4.96E-3	J			"	5.000E-3		99%	80-120		
Surrogate: Carbon tetrachloride	0.0692				"	8.600E-2		80%	80-120		

Batch B411044 - ColdTrap Dehydration

Blank (B411044-BLK1)		Prepared & Analyzed: Sep-22-14									
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Ethanol	U	J		0.0500	ppbv						
Isopropyl alcohol	0.125	J		0.0500	"						
Acetone	0.106	J		0.0250	"						
Methylene chloride	U			0.100	"						
Surrogate: Dichlorodifluoromethane	U				"	0.5250		%	90-120		
Surrogate: Trichlorofluoromethane	U				"	0.2390		%	90-120		



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B411044 - ColdTrap Dehydration

Blank (B411044-BLK1)

Prepared & Analyzed: Sep-22-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Surrogate: Carbon tetrachloride U ppbv 8.600E-2 % 80-120

Blank (B411044-BLK2)

Prepared: Sep-22-14 Analyzed: Sep-23-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Ethanol	U	J		0.0500	ppbv						
Isopropyl alcohol	0.0737	J		0.0500	"						
Acetone	0.110	J		0.0250	"						
Methylene chloride	U			0.100	"						
Surrogate: Dichlorodifluoromethane	U				"	0.5250		%	90-120		
Surrogate: Trichlorofluoromethane	U				"	0.2390		%	90-120		
Surrogate: Carbon tetrachloride	U				"	8.600E-2		%	80-120		

LCS (B411044-BS1)

Prepared & Analyzed: Sep-22-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Ethanol	0.628	J		0.0500	ppbv	0.5000		126%	50-124		
Isopropyl alcohol	0.400	J		0.0500	"	0.5000		80%	81-106		
Acetone	0.436	J		0.0250	"	0.5000		87%	60-137		
Methylene chloride	0.513			0.100	"	0.5000		103%	78.7-117		
Surrogate: Dichlorodifluoromethane	0.475				"	0.5000		95%	77.8-116		
Surrogate: Trichlorofluoromethane	0.504				"	0.5000		101%	78.6-114		
Surrogate: Carbon tetrachloride	0.511				"	0.5000		102%	76.3-118		

LCS Dup (B411044-BSD1)

Prepared & Analyzed: Sep-22-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Ethanol	0.674	J		0.0500	ppbv	0.5000		135%	50-124	7	200
Isopropyl alcohol	0.355	J		0.0500	"	0.5000		71%	81-106	12	25
Acetone	0.430	J		0.0250	"	0.5000		86%	60-137	1	28.7
Methylene chloride	0.524			0.100	"	0.5000		105%	78.7-117	2	20.7
Surrogate: Dichlorodifluoromethane	0.486				"	0.5000		97%	77.8-116		



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Chicago Regional Laboratory

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Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-13-15 14:58

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B411044 - ColdTrap Dehydration

LCS Dup (B411044-BSD1)

Prepared: Sep-22-14 Analyzed: Sep-23-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Surrogate: Trichlorofluoromethane	0.501				ppbv	0.5000		100%	78.6-114		
Surrogate: Carbon tetrachloride	0.515				"	0.5000		103%	76.3-118		

LCS Dup (B411044-BSD2)

Prepared: Sep-22-14 Analyzed: Sep-23-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Ethanol	0.612	J		0.0500	ppbv	0.5000		122%	50-124	200	200
Isopropyl alcohol	0.355	J		0.0500	"	0.5000		71%	81-106	200	25
Acetone	0.435	J		0.0250	"	0.5000		87%	60-137	200	28.7
Methylene chloride	0.523			0.100	"	0.5000		105%	78.7-117	200	20.7
Surrogate: Dichlorodifluoromethane	0.490				"	0.5000		98%	77.8-116		
Surrogate: Trichlorofluoromethane	0.446				"	0.5000		89%	78.6-114		
Surrogate: Carbon tetrachloride	0.532				"	0.5000		106%	76.3-118		

Duplicate (B411044-DUP1)

Source: 1409007-03RE1

Prepared & Analyzed: Sep-22-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Ethanol	2.42	J		0.500	ppbv		2.26			7	40
Acetone	1.80	J		0.250	"		2.80			43	40
Surrogate: Dichlorodifluoromethane	0.450				"	0.5250		86%	90-120		
Surrogate: Trichlorofluoromethane	0.190				"	0.2390		79%	90-120		

Duplicate (B411044-DUP2)

Source: 1409007-04RE1

Prepared: Sep-22-14 Analyzed: Sep-23-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Ethanol	2.29	J		0.0500	ppbv		2.33			2	40
Isopropyl alcohol	1.01	J		0.0500	"		1.02			0.5	40
Acetone	2.46	J		0.0250	"		2.42			2	40
Methylene chloride	0.175			0.100	"		0.164			6	30
Surrogate: Dichlorodifluoromethane	0.413				"	0.5250		79%	90-120		
Surrogate: Trichlorofluoromethane	0.196				"	0.2390		82%	90-120		
Surrogate: Carbon tetrachloride	0.0664				"	8.600E-2		77%	80-120		



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Notes and Definitions

R	Rejected
K	The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Not Detected
NR	Not Reported